STATUS REPORT ON THE

1982 BAY AREA AIR QUALITY PLAN

Association of Bay Area Governments
Bay Area Air Quality Management District
Metropolitan Transportation Commission

December 1981

EXECUTIVE SUMMARY

The 1979 Bay Area Air Quality Plan showed that attainment of the national ozone standard was not possible by 1982. With the implementation of all reasonably available measures, Federal regulations allow for a 1982 update of the plan to insure ozone attainment as expeditiously as practicable, but not later than the end of 1987. This summary covers the highlights of the current status of the 1982 Plan.

OZONE

The Livermore Regional Air Quality (LIRAQ) model was the main tool used in the preparation of the plan. This regional, computerized model has been improved with new photochemistry, and its emission inventory and meteorological inputs were completely redone. Figure A graphically displays LIRAQ results for baseline emissions. Baseline here means 1979 and 1987 analyses that reflect only existing control programs on-the-books. The two bars in Figure A are divided into stationary, mobile and natural emissions in tons per day for 1979 and 1987. The corresponding ozone level is shown at the top of each bar, as simulated by LIRAQ and adjusted for the worst ozone readings in 1977-79. Figure A assesses the probable 1987 ozone status, given only the continuation of existing control programs. It projects that present programs will reduce high-hour ozone to 0.16 ppm by 1987 and will not achieve the Federal standard of 0.12 ppm.

Figure B displays the essentials of estimating hydrocarbon emission reduction requirements using LIRAQ. The first bar repeats the projected 1987 baseline plot. The second represents one of many different ways to reduce 1987 emissions. This "Control Test" example shows overall emissions reduced to a level below that necessary to attain the Federal standard of 0.12 ppm, while maintaining the same proportion of mobile to stationary emissions. Many other potential strategies could be similarly tested, based on the control of different sources at different times and places. A dashed, horizontal band has been drawn to represent the range of allowable emissions likely to be necessary to meet the 0.12 ppm ozone standard. The main points of Figure B are:

1) the band of attainment converts to a reduction of projected 1987 hydrocarbon emissions by 100 to 150 tons per day,

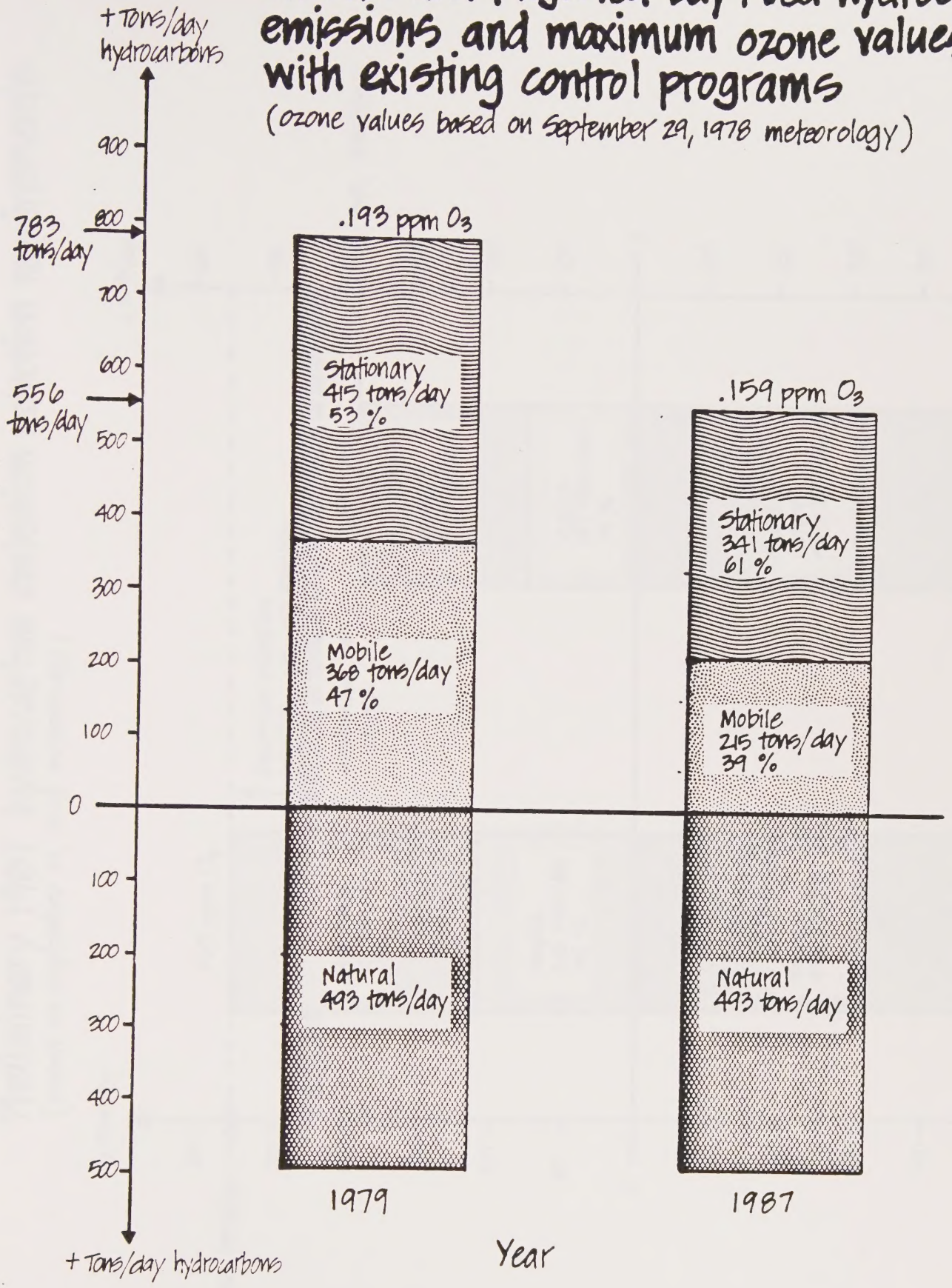
2) further analysis should be conducted to determine the optimum strategy within the band.

A total of 108 tons/day of potential additional hydrocarbon emission reductions have thus far been identified to satisfy the new emission reduction estimate. The BAAQMD has assessed thirteen new or tightened regulations on stationary sources that together will yield a reduction of 50 tons/day. A motor vehicle inspection/maintenance program is estimated to reduce an additional 50 tons/day. Finally, transportation programs and control of other miscellaneous sources are estimated to result in an 8-tons/day reduction.

Figure A.

Current and projected Bay Area hydrocarbon emissions and maximum ozone values with existing control programs

(ozone values based on September 29, 1978 meteorology)

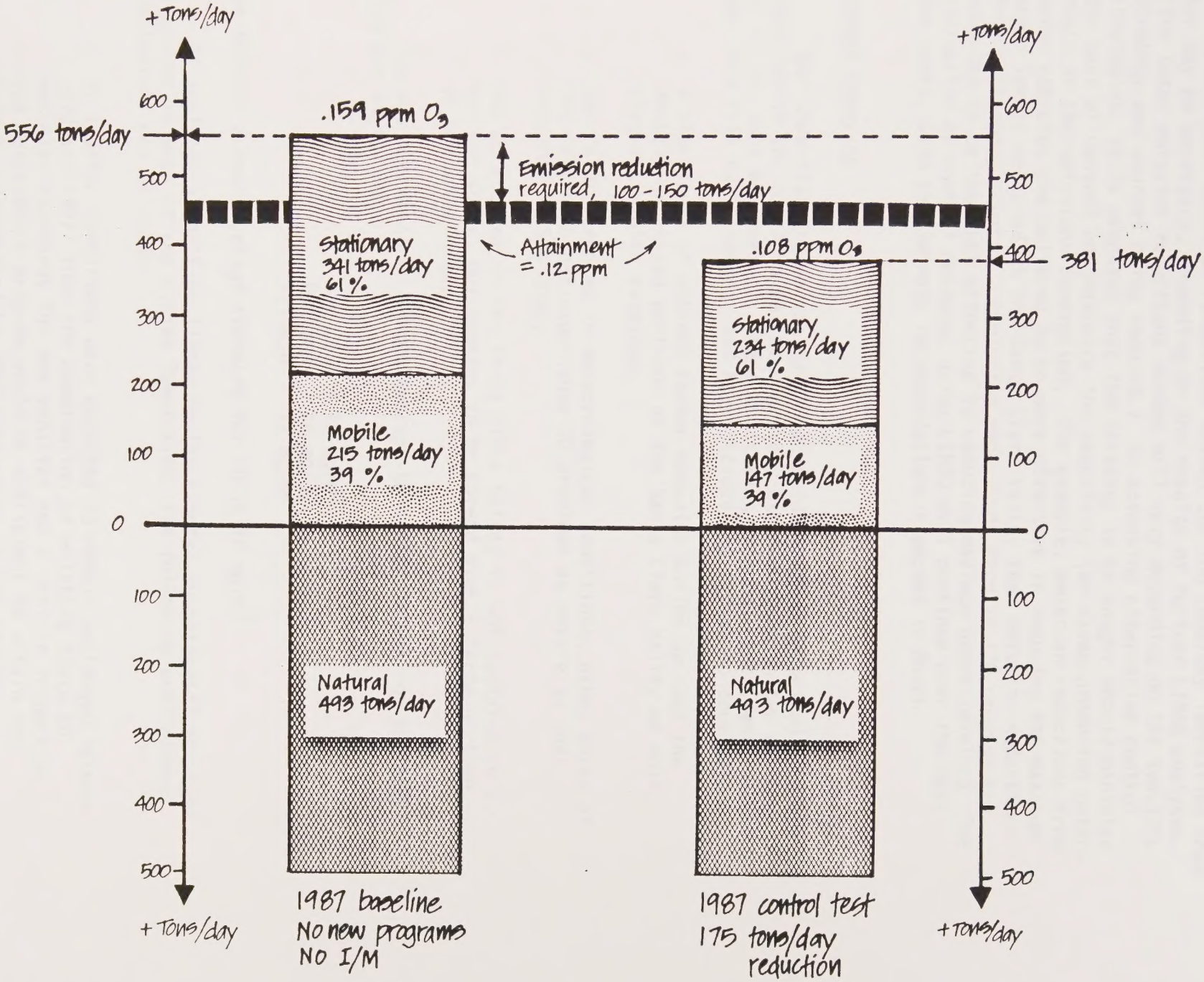


* Hydrocarbon emissions from natural vegetation are shown to indicate the magnitude of emissions involved. Their spatial distribution throughout the Bay Area differs radically from man-made sources so that their impact on maximum ozone levels is expected to differ. Further sensitivity tests are planned to determine these differences.

Figure B.

Preliminary 1987 hydrocarbon emission reduction requirements

(Based on September 29, 1978 meteorology)



Additional emission reductions beyond the 108 tons/day identified thus far may be necessary, depending on the results of further LIRAQ analyses. (The total emission reductions needed will vary depending on the specific strategy and sources being reduced.) In assessing alternative control strategies, it is proposed that the strategy to be sought should minimize the cost of control and maximize the reactivity (or ozone-producing potential) of the emissions controlled. For example, emission reductions from motor vehicles are believed to be more effective in reducing the maximum ozone levels measured in the Santa Clara Valley than emission reductions from stationary sources. (Emission reductions from an I/M program are expected to be the most effective in reducing maximum ozone levels.) The evaluation of control measures using LIRAQ will continue over the next few weeks, with preliminary recommendations expected in March.

CARBON MONOXIDE

Our understanding of the carbon monoxide problem generated by motor vehicles in the Bay Area has been greatly expanded through two winters of CO hot spot monitoring. These monitoring programs were identified in the 1979 Plan to be needed, and have yielded the following conclusions:

- o A high level of ambient carbon monoxide builds up over the densely urbanized portions of the Santa Clara Valley on cold, stagnant winter evenings;

- o Due to differences in meteorological conditions, other parts of the region do not experience CO problems as severe as that measured in San Jose;

- o The CO problem in the Santa Clara Valley is not isolated to a few hot spots, but appears to be spread over a large portion of the urban area.

The maximum measured 8-hour average CO design values for the 1982 Plan are as follows:

San Jose - 18 mg/m^3
Oakland - 16 mg/m^3
Vallejo - 12 mg/m^3

The Federal 8-hour average standard for CO is 10 mg/m^3.

By applying a modified linear rollback model to potential hot spot locations in each of the cities identified, the following preliminary conclusions may be drawn:

- o If traffic conditions were expected to remain unchanged between 1979 and 1987, then the combination of existing State CO emission standards for new vehicles and a vehicle inspection and maintenance program would be sufficient to attain the Federal CO standard by 1987 everywhere in the region.

- Since Vallejo is so close to the standard now, it is expected to be in attainment by 1987 without I/M.

- Oakland's CO problem is more severe than Vallejo, but its traffic growth projections are modest. Therefore, although I/M will be necessary for Oakland to attain the CO standard, no additional controls beyond I/M should be necessary.

- San Jose has the most severe CO problem measured thus far in the region, and is also projecting significant increases in traffic between 1980 and 1990. Therefore, additional programs to mitigate the impacts of this growth on CO levels will be needed if the 8-hour CO standard is to be attained in San Jose by 1987.

Further analyses are currently being developed to determine whether the substantial transportation programs currently being planned in San Jose will be adequate to attain the Federal 8-hour CO standard by 1987.

STATUS REPORT ON THE 1982 BAY AREA AIR QUALITY PLAN

This report describes preliminary results from the most recent analyses of future ozone and carbon monoxide levels in the San Francisco Bay Area. Also described are control strategy options currently being evaluated that may provide further air quality improvements in the future. Before describing these results, a brief history of the 1979 Bay Area Air Quality Plan and the Annual Air Quality Report for 1980 will be presented.

BACKGROUND

The 1979 Bay Area Air Quality Plan was adopted in January 1979 (and subsequently modified in May 1979) and forwarded to the State for incorporation into the State Implementation Plan (SIP). The Bay Area was designated under the 1977 Clean Air Act to be a Non-attainment Area for ozone (O_3), carbon monoxide (CO), and total suspended particulates (TSP). The 1979 Plan was prepared in response to the Non-attainment Plan requirements contained in the Act. Following State and federal EPA reviews, it was determined that the 1979 Plan satisfied federal requirements with one major exception: there was no legal authorization for implementation of a motor vehicle inspection and maintenance program.

Ozone

The Livermore Regional Air Quality Model (LIRAQ) was used to identify a hydrocarbon emissions level of 572 tons per day as the emissions level that would result in attainment of the one-hour .12 ppm federal ozone standard. LIRAQ also indicated that reductions in NO_x emissions would result in increased levels of ozone, therefore no NO_x control programs were included in the 1979 Plan.

In order to achieve a hydrocarbon emissions level of 572 tons, a reduction of 247 tons from the projected 1985 inventory was needed. Table 1 summarizes the programs in the Plan and their expected emission reductions.

TABLE 1. SUMMARY OF HYDROCARBON EMISSION REDUCTIONS FROM THE 1979 BAY AREA AIR QUALITY PLAN

Control Program	Projected 1985 Hydrocarbon Emission Reduction
o Use of available control technology on existing stationary sources	225 tons/day
o New source review	32 tons/day
o Motor vehicle inspection and maintenance	23 tons/day
o Transportation system improvements	5 tons/day
	Total 285 tons/day

The total emission reduction of 285 tons/day projected from these programs was greater than the amount projected to be necessary for attainment of the ozone standard for two reasons:

- The California Air Resources Board staff had questioned the emissions estimates for certain source categories based on data that they had recently collected. Since resolution of the issue was expected to require lengthy reexamination and comparisons of the data, it was agreed that an allowance for uncertainty of 18 tons/day would be incorporated into the plan.

- New Source Review was a controversial program at the time and many feared that it would stifle industrial growth in the region. In response to these fears, a growth increment of approximately 20 tons/day was incorporated into the plan. The California Air Resources Board agreed with this under the principal condition that three years of "reasonable further progress" would have to be demonstrated (1979-1981) before the growth increment could be used.

Carbon Monoxide (CO)

In the case of carbon monoxide, a linear rollback analysis based on the total Bay Area inventory of CO emissions was used to define the emission reduction requirement. This type of analysis was considered extremely crude, and CO hot spot monitoring was identified as an important task for future work. It was hoped that the additional monitoring would serve to better define the nature and extent of CO problems in the Bay Area. Based on the linear rollback analysis, it was concluded that the programs adopted to reduce hydrocarbon emissions (particularly I/M) would also be sufficient to meet the federal 8-hour CO standard by 1985.

Total Suspended Particulates (TSP)

In November 1980, the Bay Area adopted a plan for TSP and forwarded this plan to the State and EPA for approval. The TSP plan indicated that the apparent cause of excesses of the federal secondary TSP standard in Santa Clara County was "fugitive dust." Fugitive dust emissions occur from a variety of activities including construction and demolition, and from motor vehicle travel over paved and unpaved roads. Fugitive dust emissions are difficult to control with current state-of-the-art methods, so the plan called for continued research. It also called for reductions in vehicle-miles-traveled in the San Jose Central Planning Area and consideration of a fugitive dust control rule by the BAAQMD.

The Environmental Protection Agency has not yet acted to either approve or disapprove the TSP plan. EPA has proposed disapproval of the 1979 Plan for ozone and CO due to the lack of legal authority to implement the vehicle inspection and maintenance program. Despite the numerous attempts that have taken place and are continuing, the California Legislature has not been able to agree on an I/M program for the state.

Annual Report for 1980

In July 1981, ABAG, BAAQMD, and MTC published the San Francisco Bay Area Annual Air Quality Report for 1980. This report summarized the

progress made during 1980 to implement the 1979 Plan. The report indicated that:

> "Except for motor vehicle inspection and maintenance, all of the programs adopted in the 1979 Bay Area Air Quality Plan (as modified in May 1979) are being implemented as scheduled. Emissions continued to be reduced in 1980, and substantial further reductions are expected in future years. Air quality in general has improved; however, in the case of ozone the number of days exceeding the federal standard increased slightly in 1980 (compared with 1979).
>
> "At present, we may conclude on the basis of guidelines specified by EPA, that reasonable further progress based on emissions is being made toward attainment of federal air quality standards in the Bay Area. A substantive technical demonstration of this conclusion is not possible at this time due to difficulties in comparing the revised emission inventory estimates with those contained in the 1979 Plan.
>
> "Ambient air quality data suggest that improvements in ozone air quality are not occurring as rapidly as the reduction in hydrocarbon emissions, and this potential divergence of the two trends will be carefully tracked in future annual reports. Ambient carbon monoxide hotspot monitoring data have confirmed that on a localized basis, CO problems are more severe than originally reported in the 1979 Plan.
>
> "The 1982 Plan will include a detailed reevaluation of future air quality and any alternative additional control programs that may be needed."

Figure 1 was taken from the Annual Report and illustrates the most recent projection of hydrocarbon emissions for the Bay Area assuming continued implementation of the control programs adopted in the 1979 Plan. What is not shown on this graph is an updated estimate of the allowable emissions level. The allowable emissions level from the 1979 Plan of 572 tons/day was based on the inventory estimates available at the time. These estimates have changed, as was indicated in the Annual Report, and therefore a new allowable emissions level needed to be computed. The remainder of this report describes the updated analyses for ozone and CO and their implications for future control programs.

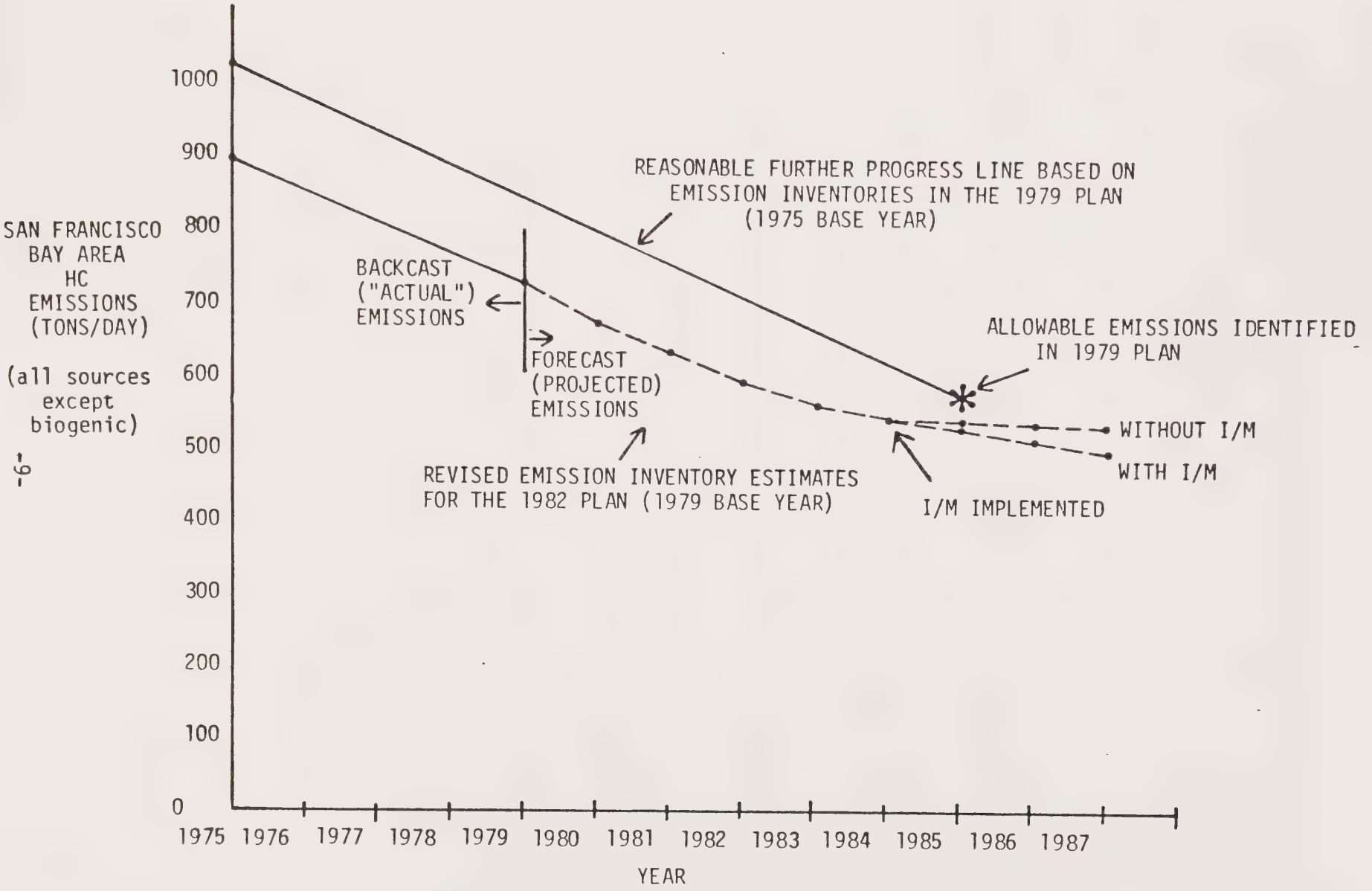


Figure 1. Comparison of revised hydrocarbon emission inventory estimates with the Reasonable Further Progress line identified in the 1979 Plan for all sources except biogenic.

Source: San Francisco Bay Area Annual Air Quality Report for 1980.

RESULTS OF RECENT ANALYSES

The analyses of ozone and carbon monoxide being prepared for the 1982 Plan indicate that in both cases more control will be needed to meet the respective standards than was originally forecast in the 1979 Plan. In general, the data base for these analyses has been completely updated since 1979. The new data, together with improvements in the air quality forecasting tools employed, and more experienced judgment in estimating the ultimate effectiveness of control programs combine to yield this result.

Ozone

The analysis of future ozone levels in the Bay Area was based on the latest version of the Livermore Regional Air Quality (LIRAQ) Model. The following factors have been changed from the 1979 Plan analysis:

- The LIRAQ model's photochemistry has been updated to handle four classes of organic compounds rather than three (so that aromatic hydrocarbons may be more accurately treated), and the rate constants for key reactions have been revised to reflect the most recently available research results;

- The hydrocarbon and nitrogen oxides emission inventories have been updated, and include for the first time estimates of hydrocarbon emissions from natural vegetation;

- The prototype meteorology used in LIRAQ to simulate the transport and diffusion of pollutants across the region has been updated and includes "worst case days" for ozone buildup. (For the 1979 Plan, the day used was a high ozone day, but not the worst case, and the results had to be corrected for this fact.)

Three types of computer simulations (or "runs") have been prepared using the updated model and input data. The first runs established baseyear conditions, where computer simulated ozone was verified against observed ozone for 1979. Next, a baseline projection of high hour ozone was then simulated for 1987 based on the projected 1987 emission inventory with no new control programs beyond those now being implemented. Finally, runs were made to establish an overall emission reduction target for the Bay Area since the 1987 baseline run indicated that the ozone standard would not be attained with the existing control programs. Over the next several weeks specific sensitivity tests and control strategy runs will be made to help design the strategy that will produce attainment of the ozone standard.

Quantitative summaries of the results achieved thus far are contained in Figures 2 and 3. Figure 2 displays the baseline results for 1979 and 1987. High hour ozone is shown at the top of each bar, as observed in 1979 and simulated in 1987. The most important number on Figure 2 is .159 ppm ozone in 1987. This result indicates that the

Figure 2.

current and projected Bay Area hydrocarbon emissions and maximum ozone values with existing control programs

(ozone values based on September 29, 1978 meteorology)

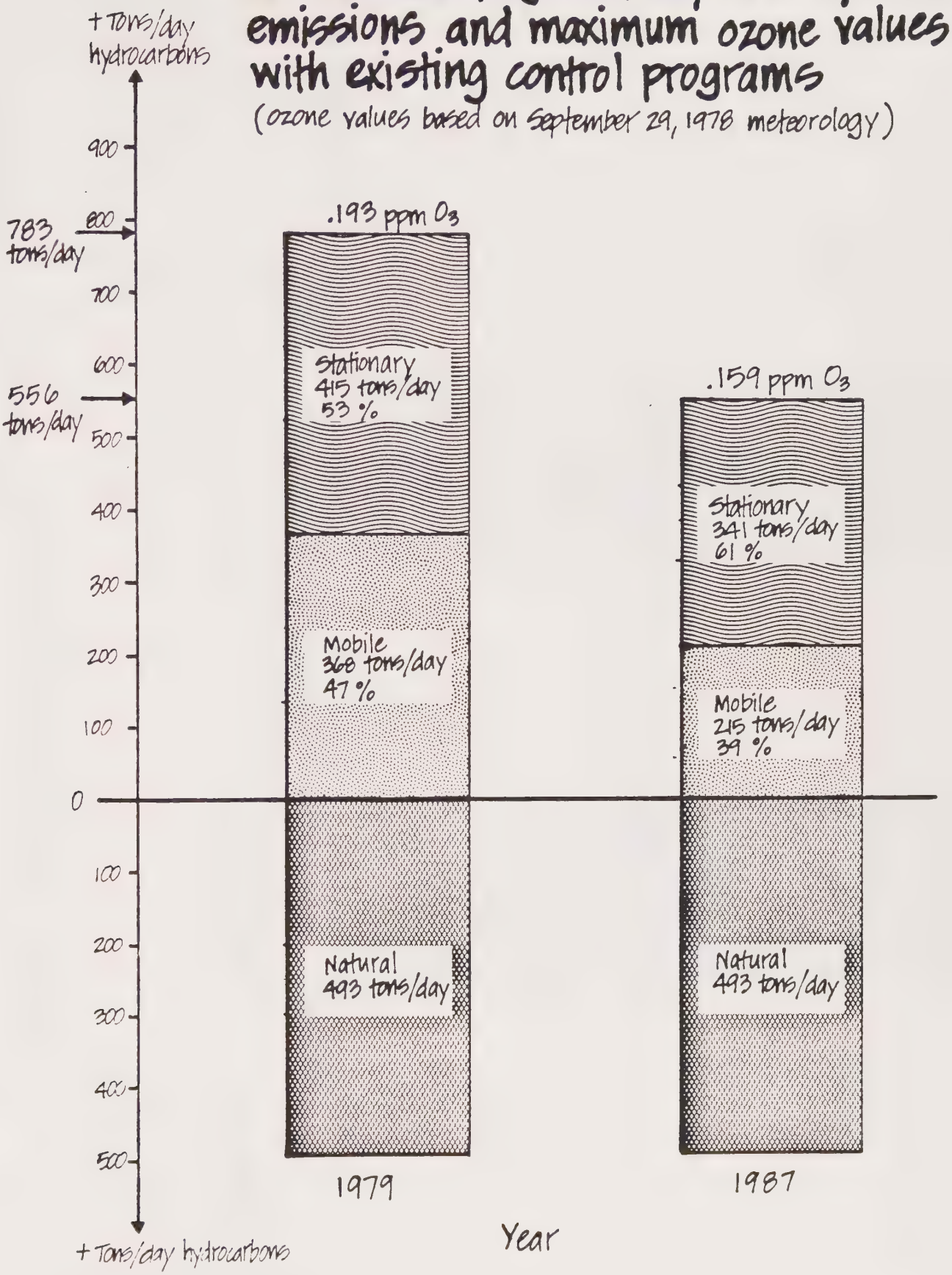


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Figure 3.

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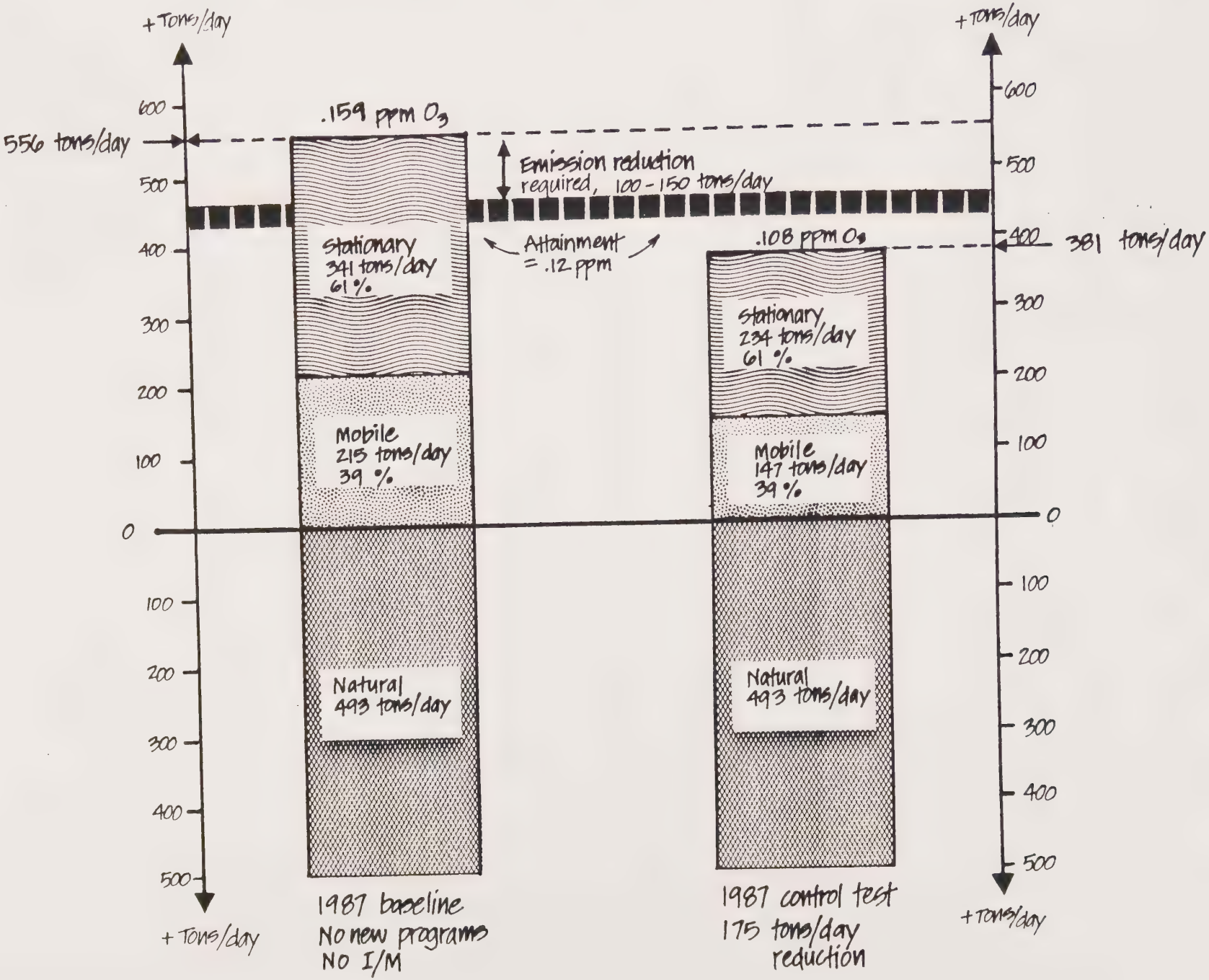

standard of 0.12 ppm will not be met, unless new reductions are obtained. Each emission bar in Figure 2 is divided into parts representing the major emission classes--mobile, stationary, and natural. Labels identify these divisions and the associated tonnages and percents.

Figure 3 displays graphically the allowable hydrocarbon emissions and the emission target for 1987. The first bar is simply a repeat of the 1987 baseline result from Figure 2. The other bar reflects a proportional, "across-the-board" reduction of 175 tons per day, respectively. High hour ozone calculated by LIRAQ is shown, as before, at the top of each bar. The resulting hydrocarbon emissions reduction requirement ranges from 100 to 150 tons/day by 1987.

Carbon Monoxide

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PRELIMINARY EVALUATION OF ALTERNATIVE CONTROL MEASURES

In the 1979 Plan, alternative control measures were divided into four categories: stationary source controls; mobile source emission controls; transportation controls; and other measures. These categories will also be used for the 1982 Plan. Stationary source controls are all aimed at reducing hydrocarbon (HC) or volatile organic compounds (VOC) emissions to control ozone levels. Mobile source emission controls are technology-oriented controls to reduce both hydrocarbon and carbon monoxide emissions from motor vehicles. Transportation controls are designed to reduce automobile use and therefore reduce HC and CO emissions by encouraging the use of other travel modes such as mass transit and high occupancy vehicles (carpools, vanpools, etc.). The "Other measures" category may include emission controls for off-road heavy duty equipment and gasoline-powered lawn and garden equipment. The following sections are summaries of the preliminary assessment of control measures in each category. More detailed documentation is currently being prepared.

Stationary Source Controls

The Bay Area Air Quality Management District is the primary implementing agency for stationary source controls. Due to its long history of regulation of stationary sources in the Bay Area, the relatively inexpensive measures have for the most part been already implemented. The BAAQMD's present Regulation 8 Rules 1 through 28 are expected to achieve by 1987 a net emission reduction of 117 tons/day from 1979 levels. Thirteen additional rules (or modifications to existing rules) which should be considered for the 1982 Plan are summarized in Table 2. These thirteen rules would provide an additional 50 tons/day net hydrocarbon emission reduction by 1987 at an estimated cost of $76 million initially and an additional $8.8 million per year in maintenance, repair, and operation expenses. This works out roughly to about $1000 per ton/day removed on an annualized basis.

Some of the proposed rules are modifications to existing BAAQMD organic emission rules. The two proposed rules that are the most effective from an emission reduction standpoint are S-8 (substitution of non-reactive propellants in pressurized aerosol cans) and S-13 (tighten Regulation 8, Rule 5 covering VOC storage tanks). These two proposed rules account for half of the total emission reductions identified for stationary sources in this preliminary evaluation.

Mobile Source Emission Controls

The California Air Resources Board is the primary implementing agency for mobile source emission controls. As with stationary source controls, the long history of vehicle emission control in California means that the technologically feasible, relatively inexpensive measures have already been implemented. A motor vehicle inspection and maintenance (I/M) program is a vital link in the overall strategy for control of vehicle emissions. Such a program was adopted in the 1979 Plan; since the California legislature has thus far been unable to adopt the necessary authorizing legislation for I/M, this program will be proposed once more for the 1982 Plan. The most recent version of I/M legislation is SB 33 (Presley), which has been passed by the Senate and is currently awaiting action in the Assembly. Cost and effectiveness estimates for I/M vary widely depending upon the assumptions made about how it will ultimately be designed, implemented, and enforced. The most recent data from EPA indicate that a 33 percent

TABLE 2. SUMMARY OF PROPOSED NEW OR MODIFIED ORGANIC EMISSION RULES

RULE CAPTION BRIEF		BRIEF DESCRIPTION OF SOURCE AND POSSIBLE METHODS OF CONTROL/PROCESS CHANGE/OTHER	CAPITAL COST ($ millions)	MAINTENANCE, REPAIR, & OPERATING		ORGANIC EMISSION CONTROL		APPROX. NUMBER OF PLANTS/ SOURCES
No.	Type			%	$ million/yr.	%	tons/day	
S-1	Organic chemical manufacturing	a. Process vessel depressuring - vapor recovery, flared or incinerated b. Pumps and compressor seals - best modern practice ≤ 10,000 ppm C_6 c. Process relief valves - vent to vapor recovery; install rupture disc	0.20	10	0.02	60	0.3	10/2000
S-2	Complying coating & solvents (more restrictive Reg.8-4)	Reduce existing 3000 lbs/day & 450 lbs/hour to 600 lbs/day and 100 lbs/hour. Requires process change or adsorption and/or incineration.	2.20	10	0.22	50	3.0	100/1000
S-3	Letter press/ offset printing exemption - Reg.8-20-112 delete	Use low solvent inks or reduce organic emissions by 75% mass weight by adsorption or incineration.	4.8	10	0.48	60	2.7	100/4
S-4	Gas & crude oil process/ production	Fugitive emissions controlled as per Rule S-1 a, b, & c above. Also restrict storage tankage to 0.5 psia vapor pressure and ≥ 10,000 gal. tanks.	1.6	10	0.16	70	1.6	20/1000
S-5	Polymers & resins - manufacturing	Polyester resin emissions must employ a closed vapor system or use alternatives as absorption/ incineration for 90% control.	0.35	10	0.04	40	0.2	25/70
S-6	Wood furniture coating manufacturing and strengthen flat wood Reg.8-Rule 23	Limit flat wood coating (as in Reg.8-23) to 700 grams VOC/liter - 50% transfer. In Reg.8-14, restrict coating material to 125 grams of VOC/liter or equivalent control methods for 75% control efficiency.	0.75	10	0.08	55	1.1	5/25
S-7	Hazardous waste disposal	Requires stripping & incineration of volatile organic compounds from all waste material to 1% VOC by volume prior to land disposal employing impervious 3 foot earth-gravel layer over wastes to insure ~60% control of organic emissions.	2.4	40	0.96	60	1.8	4/20
S-8	Consumer solvents - aerosol cans only	Write new rule that exempts all consumer solvent usage except aerosol cans which must substitute nitrogen or carbon dioxide for the propane and butanes now used to pressurize the cans.	8.5	15	1.30	95	15.6	40/NA
S-9	Marine lightering	New rule requiring supertankers to discharge to smaller tankers equipped with floating roof tanks or vapor recovery systems (purging, segregation & vapor control - BAAQMD jurisdiction; ballast - Coast Guard jurisdiction).	6.0	10	0.60	80	2.1	20/200

TABLE 2. SUMMARY OF PROPOSED NEW OR MODIFIED ORGANIC EMISSION RULES (Cont'd.)

RULE CAPTION BRIEF		BRIEF DESCRIPTION OF SOURCE AND POSSIBLE METHODS OF CONTROL/PROCESS CHANGE/OTHER	CAPITAL COST ($ millions)	MAINTENANCE, REPAIR, & OPERATING		ORGANIC EMISSION CONTROL		APPROX. NUMBER OF PLANTS/ SOURCES
No.	Type			%	$ million/yr.	%	tons/day	
S-10	Ship, barge, tanker & railroad cars - VOC loading	Require vapor recovery system including condensation, absorption & incineration for 90% control of organic emissions.	16.0	10	1.60	40	5.6	5/100
S-11	Truck VOC loading (gasoline at bulk plants & terminals)	Requires more restrictive Reg.8-6 (i.e., 2740 gal/day and 1,000,000 gal/year lower limit of gasoline throughput), requires a certified vapor balance system of 95% efficiency.	4.8	10	0.48	60	1.5	24/300
S-12	General solvent coating	Requires more restrictive rule of 120/700 grams of VOC per liter coating applied or equivalent control (similar to Reg.8-3, add flat).	6.6	10	0.66	60	4.2	330/1500
S-13	Volatile organic compound storage	Modify Reg.8-5 so that organic storage tank emissions from tanks ≥ 10,000 gallons and 0.5 psia vapor pressure require vapor control or double seal floating roof tanks.	21.75	10	2.18	45	10.2	25/290
	Sub-totals		75.95	NA	8.78	NA	49.9	685/6500

reduction in hydrocarbons and a 29 percent reduction in carbon monoxide emissions from automobiles are reasonable estimates of the effectiveness of an I/M program within the provisions of SB 33. This translates to emission reductions in the Bay Area of approximately 50 tons of hydrocarbons and 450 tons of carbon monoxide.

Aside from I/M for light duty vehicles, ARB is developing antitampering regulations for on-highway heavy duty vehicle engines. This control measure will become important in later years when the emission standards for new heavy duty vehicles take full effect. By 1987, preliminary estimates indicate that an emission reduction of roughly 0.2 tons/day of hydrocarbons and 16 tons/day of carbon monoxide may be achieved by this measure.

Transportation Control Measures

The Metropolitan Transportation Commission is the transportation planning agency for the Bay Area. Implementation authority for transportation measures, however, is scattered among many agencies at the federal, state, regional and local levels.

As part of the effort leading to a 1982 Air Quality Plan Revision, MTC is required to analyze a series of transportation controls. The 1977 Clean Air Act defines 18 measures as "reasonably available." Three of these (Inspection/Maintenance Program, Heavy Duty Vehicle Retrofit Program, and a Vapor Recovery Program) are outside of MTC's domain. A fourth category, Control of Extreme Cold Start Emissions, is not applicable to the Bay Area because of our moderate climate. The remaining fourteen categories are listed below.

I. programs for improved public transit

II. programs to establish exclusive bus and carpool lanes and areawide carpool programs

III. programs to limit portions of road surfaces or certain sections of the metropolitan areas to the use of common carriers, both as to time and place

IV. programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of nonmotorized vehicles or pedestrian use, both as to time and place

V. programs for long-range transit improvements involving new transportation policies and transportation facilities or major changes in existing facilities

VI. programs to control on-street parking

VII. programs to construct new parking facilities and operate existing parking facilities for the purpose of park and ride lots and fringe parking

VIII. provisions for employer participation in programs to encourage carpooling, vanpooling, mass transit, bicycling, and walking

IX. programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas

X. programs of staggered hours of work

XI. programs to institute road user charges, tolls, or differential rates to discourage single occupancy automobile trips

XII. programs to control extended idling of vehicles

XIII. programs to reduce emissions by improvements in traffic flow

XIV. programs for the conversion of fleet vehicles to cleaner engines or fuels, or to otherwise control fleet vehicle operations

Each of these categories was reviewed as to:

1. Its relationship to existing MTC policy

2. The potential emission reductions from actions in this category

3. Proposals for specific programs

The policies referred to are air quality policies adopted by MTC in March of 1978 and incorporated into the RTP in September of 1978. If the air quality policies were not relevant to a particular category, reference was made to general Regional Transportation Plan (RTP) policies. As a result of this analysis, no change is recommended to the air quality policies. The complete analysis is contained in the appendix to this report.

The transportation actions proposed will not reduce auto travel significantly. It seems clear that it is extremely difficult to effect significant changes in travel. This is borne out by the response to the gas price increases in 1974 and 1979. Although travel dropped initially after these increases, the reduction seemed to be only temporary. Because of this difficulty in affecting travel, it is critical to control vehicle pollution by maintaining strict emission standards.

Table 3 summarizes the proposed regional transportation control measures for the 1982 Plan, and includes a preliminary assessment of their effectiveness and costs. (Additional details are provided in Appendix A.) Each of the proposals is consistent with MTC policy and is stated in terms of MTC's specific authority in each case. The total hydrocarbon emission reduction potential of these measures is 2 or 3 tons/day, depending on whether an I/M program is implemented.

TABLE 3. PRELIMINARY ASSESSMENT OF PROPOSED REGIONAL TRANSPORTATION CONTROL MEASURES FOR THE 1982 PLAN*

Measure	Proposal	Without I/M			With I/M			Energy Impacts gals/gas saved per day	Costs
		HC	CO	HO_x	HC	CO	HO_x		
I 1	Reaffirm commitment to 28% ridership increase between 1978 through 1983.	Already Included in Baseline						---	---
I 2	Support post-1983 improvements identified in operator's 5-year plans, after consultation with the operators adopt ridership increase target for 1983-1987.	0.95	10.49	1.04	0.63	7.34	1.04	31,600	No additional costs
I 3	Seek to expand and improve public transit beyond committed levels.	.49	5.39	.54	.32	3.77	.54	16,300	Capital: $272.5 million Operating: $234.6 million
II 1	Continue to support development of HOV lanes. (Emission credit would not be allowed for specific projects until environmental studies were completed and funds were programmed.)	Depends on Specific Project						---	---
II 2	Continue to support RIDES efforts.	Already Included in Baseline						---	---
V 1	Continue efforts to obtain funding to support long-range transit improvements.	No Effect by 1987						---	5 year design costs: $35 million 5 year construction: $181 million
VII 1	Reaffirm commitment to preferential parking programs.	Already Included in Baseline						---	$3.25 million
VII 2	Encourage transit operators to work with Caltrans to identify under-utilized lots along major transit lines which could be used as park-and-ride lots.	.06	.66	.05	.04	.46	.05	1,900	5 year costs: $200,000
VIII 1	Continue present Commute Alternative Program.	.11	1.23	.09	.07	.86	.09	3,500	$62,000/year
VIII 2	Encourage cities to change zoning regulations to decrease parking requirements for employers who encourage car/vanpooling.	.19	2.13	.23	.13	1.49	.23	7,000	No additional costs
IX 1	Complete the bicycle element of the MTC Regional Transportation Plan.	.61	7.68	.14	.40	5.38	.14	3,300	Approximate capital cost: $10.1 million
X 1	Continue MTC Commute Alternatives Program and place additional emphasis on flextime program.	.64	7.14	.33	.42	5.00	.33	14,400	$ 120,000
XII 1	Encourage cities to use CEQA-enforcement procedures to restrict the development of commercial drive-through facilities.	.18	1.91	.04	.12	1.34	.04	1,000	No additional costs
XII 2	Encourage large delivery fleet operators to restrict vehicle idling either through company policy or the use of vehicle controls.	.01	.19	<.01	.01	.13	<.01	100	Administrative costs: $15,000
XIV 1	Disseminate information on the economic and technical benefits of alternative engines and fuels to fleet operators in the Bay Area.	.01	.17	.01	.01	.12	.01	1,100	Administrative costs: $ 5,000

*Because estimated amounts are extremely small, errors in estimation could easily be larger than amounts shown

In the case of the CO problem in San Jose, ABAG, MTC and BAAQMD staff are working with staff from the City of San Jose in developing control options. These options should be consistent with three major programs currently ongoing:

- o The Guadalupe Corridor alternatives analysis, which is a potential forerunner of major transit investments in the area;
- o The Downtown Transit Mall project, which will significantly improve transit access to the downtown San Jose area;
- o The San Antonio Plaza Redevelopment Project, which is a major program for the City and is consistent with sound regional growth policy.

At present, the evaluation of the impacts of these projects on future CO levels in the downtown area is running slightly behind schedule due to delays in the Guadalupe Corridor project. Whether transportation programs beyond those now being planned will be necessary to attain the CO standard is not now known, and in part depends upon the final outcome of the Guadalupe Corridor project.

Other Measures

In addition to the more traditional control programs previously enumerated, there are several other measures currently under development. First, the California Air Resources Board is developing regulations for five source categories that have not previously been subject to control. As summarized in Table 4, these measures can potentially yield emission reductions of 6.3 tons/day for hydrocarbons and 28 tons/day for carbon monoxide by 1987.

Second, the regional agencies (ABAG, BAAQMD and MTC) have been developing a proposal for an "advisory" indirect source review (ISR) program. Simply stated, indirect source review is analagous to New Source Review (NSR) except that it is applied to indirect sources of air pollution. These indirect sources are projects that do not emit pollution by themselves but induce emissions from other sources such as motor vehicles that are drawn to them. They include major shopping centers, office buildings, highways, airports and sport stadiums. ISR is potentially useful as a way of minimizing the impact of new projects on local CO levels and is thus viewed as a long-term maintenance measure.

An ISR regulation was adopted by the Bay Area Air Quality Management District in 1974, then quickly rescinded when EPA dropped its requirements for such a regulation. Since that time a number of cities and regions have successfully implemented some form of continuing ISR program. The "advisory" ISR program as currently envisioned involves no new regulations. Instead, maximum use of the existing environmental impact report (EIR) process required by the California Environmental Quality Act (CEQA) is made, with local governments retaining their traditional permit authority for such projects. The program would in effect be a more uniform and thorough environmental impact reporting and reviewing system tied to existing local permit processes.

TABLE 4. SUMMARY OF OTHER MEASURES CURRENTLY BEING DEVELOPED BY THE CALIFORNIA AIR RESOURCES BOARD

Measure	Sources affected	Estimated emission reductions for the Bay Area by 1987 (tons/day)	
		hydrocarbons	carbon monoxide
o Emission standards for off-road heavy-duty non-farm equipment	tractors, scrapers, rollers, off-highway trucks, loaders, motor generators, air compressors	1.4	4
o Emission standards for new farm equipment	tractors, balers, combines, harvesters, pickers, crop dryers, fertilizer spreaders, pumps, and sprayers	0.1	2
o Emission standards for new lawn, garden and home utility equipment	mowers, garden tractors, tillers, chain saws, auxiliary generators and pumps, portable welding machines, and refrigeration units	2.5	16
o Emission standards for new off-road motorcycles	off-road motorcycles (primarily 2-stroke)	2.1	4
o Emission standards for new boats (pleasure craft)	all boats powered by internal combustion engines and used for recreational purposes	0.2	2
	Totals	6.3 tons/day HC	28 tons/day CO

Summary of Potential Hydrocarbon Emission Reductions Identified to Date

Based on the foregoing discussion, the following hydrocarbon emission reductions have thus far been identified:

	1987 hydrocarbon emission reductions
stationary source controls -	50 tons/day
mobile source emission controls (I/M) -	50 tons/day
transportation controls -	2 tons/day
other measures -	6 tons/day
total	108 tons/day

As previously described, the most recent LIRAQ analyses indicate that a reduction of 100 to 150 tons/day will be necessary to attain the Federal ozone standard in 1987. On this basis, it is possible that the control measures identified to date will not provide emission reductions adequate for attainment of the ozone standard by 1987. (In the case of carbon monoxide, further analyses are still being developed to determine whether transportation programs currently being planned in San Jose will be adequate to attain the Federal 8-hour standard by 1987.)

ADDITIONAL CONTROL ALTERNATIVES BEING CONSIDERED

EPA's final policy regarding 1982 Plan revisions for ozone and carbon monoxide was published in the Federal Register on January 22, 1981, pp. 7182-7194. The following excerpts from that policy summarize the EPA position on dealing with attainment beyond 1987:

> "If application of RACT to all sources covered by a CTG and all other major sources, together with implementation of a vehicle I/M program and transportation controls, does not result in attainment of the ozone standards by 1987, then additional stationary source controls must be adopted.
>
> "Examples of such measures include the following:
> (1) Requiring control of all major stationary sources to levels more stringent than those generally regarded as RACT,
> (2) Extending controls to stationary sources and source categories other than those subject to the minimum control measures described in subsection B,
> (3) Implementing a broader range of transportation controls (e.g., extending the geographic coverage of some measures or providing more intensive implementation), and
> (4) Increasing the coverage and stringency of the vehicle emission I/M program.
> If implementation of all measures which can be implemented by 1987 will still not demonstrate attainment by 1987, the state should then analyze the transportation and other measures possible *in a longer time frame* that, together with the measures already evaluated, will result in attainment as quickly as possible after 1987. The specific date for attainment shall be included in the SIP. State and local governments must commit to implementation of such measures.
> Given the additional time and potential resources available to areas with a post-1987 attainment date, more extensive evidence will be required to demonstrate that any of the measures identified in section 108(f) of the Clean Air Act is not reasonably available."

The Joint Technical Staff is continuing to refine the control programs identified thus far, and is reviewing other options including those noted by EPA. One potential approach is to be more selective in the types of hydrocarbon compounds controlled. (Some are more reactive and have greater ozone producing potential than others.) Another approach is to be more geographically selective in the application of controls. The emission reduction requirement of 100-150 tons/day previously described was based on region-wide emission reductions. If either of the more selective control approaches mentioned above proves effective in reducing the maximum ozone levels, it may not be necessary to reduce total emissions by that amount. Further results will be available within the next several weeks.